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Development: The Evolving Framework of  
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### SLIDES: Understanding the Impacts: Issues of Research

Cindy Beeler

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# **MARTZ Summer Conference – Water & Air Quality Issues in O&G Development**

**“Understanding the Impacts – Issues of Research”**

Cindy Beeler.

U.S. Environmental Protection Agency

Denver, CO



# EPA's Mission

*To protect **human health** and to safeguard the natural **environment**  
-- air, water and land -- upon which life depends.*

EPA accomplishes this mission by:

- Implementing federal environmental **laws**
- Developing and enforcing **regulations**
- Providing **funding** to states and local governments
- Conducting environmental **research**
- Facilitating **partnerships** between private and public sectors
- Providing **information** to the public



# Environmental Research

- Science is the foundation that supports all of our work here at EPA.
- Strong, independent science is of paramount importance to our environmental policies.
- The quality of science that underlies our regulations is vital to the credibility of EPA's decisions and ultimately the Agency's effectiveness in protecting human health and the environment.
- One important way to ensure that sound scientific research underlies policy is to have an open and transparent peer review process.



# Different Approaches to Research Assessments

- Field research
- Laboratory studies
- Modeling
- Data analysis
- Literature review

*EPA's Study of the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources uses all these approaches*



# EPA's Hydraulic Fracturing Study

- A state of the science synthesis of a comprehensive literature review, information provided by stakeholders and technical experts, and results from 17 EPA research projects.
- Research projects operate under approved quality assurance project plans (QAPPs).
- Study follows EPA's Information Quality Guidelines
- Designated a Highly Influential Scientific Assessment (HISA)
- EPA's Scientific Advisory Board (SAB) has formed an ad hoc panel of independent experts



# Field Research/Data Collection

- Operators are important elements to success of meaningful research
- Designing water quality sampling efforts is challenging when specific information about chemical use in well drilling and completion is not available
- Knowledge of the chemicals used on site helps inform the science
- Developing successful strategies to address ozone, especially in the unique wintertime circumstances, will require an investment in air emission measurement work
- Differentiate an outlier “fat tail” emitter from a routine intermittent event
- Citizen science



# Laboratory Studies

- Knowledge of the chemicals used on site also helps inform
  - Development of appropriate analytical methods based on the matrix in which they are found
  - Selection of detection limits





# Modeling

- In EPA's Hydraulic Fracturing Study, modeling and scenario analysis with open source code has been done where possible thereby increasing transparency
- Close collaboration on models used, input parameters selected, and sensitivity analyses conducted is transparent and helpful in comprehensive understanding of model outputs



# Data Analysis

- Large number of sources associated with oil & gas production
- Temporal and spatial variability of those sources
- Different operating and maintenance practices



# Literature Review

- In EPA's Hydraulic Fracturing Study:
  - EPA conducted a thorough literature review and data analysis process to understand the most current science related to hydraulic fracturing.
  - EPA received input through a variety of mechanisms at different stages of the study.
- With adequate care and perspective third party air & water measurement research can be used to inform policy making and to plan future research